Outsource the Software Process Improvement consulting service: an alternative solution for Small-Settings[1]

Jose A. Calvo-Manzano, Gonzalo Cuevas, Tomas San Feliu, Ariel E. Serrano

Faculty of Computer Science, Polytechnic University of Madrid (UPM)[2]
{jacalvo,gcuevas,tsanfe,aserrano}@mpsei.fi.upm.es

Abstract. The focus of this paper is to outline the main structure of an alternative solution to implement a Software Process Improvement program in Small-Settings using the outsourcing infrastructure. This solution takes the advantages of the traditional outsourcing models and applies its structure to propose an alternative solution to make available a Software Process Improvement program for Small-Settings. With this outsourcing solution it is possible share the resources between several Small-Settings.

Keywords: CMMI, Outsourcing, SPI, Small-Settings.

1 Introduction

The Information Technologies (IT) outsourcing has become more popular in many companies around the word. IT outsourcing means that the physical and human resources related to an organization's information technologies activities are going to be provided by a specialized external supplier. IT outsourcing started in the late 1980s and early 1990s and its market has grown rapidly during the past 20 years [1].

Many organizations have reported the success and benefits of the outsourcing. For example a study research realized on 750 organizations from USA and Europe confirm that the majority of those polled (56%) are satisfied with their outsourcing, 38% indicate they have mixed feelings as to the value they have gained from their outsourcing, and less than 6% report dissatisfaction with their outsourcing experience [2]. Nowadays more organizations are transferring their nonessentials functions to external suppliers, reducing their structure, and limiting their activities only to business core functions [3].

[1] Small-Settings are small and medium size enterprises, small organizations within large companies, and small projects.

[2] This work is sponsored by Endesa, Evens Foundation, Sun Microsystems, through the Research Group of Software Process Improvement for Spain and Latin American Region.

The outsourcing has been used by some organizations with good results, and many successful experiences have been presented in different forums. These experiences and their advantages could be applied to design an outsourcing solution to support all Software Process Improvement activities.

1.1. Problems to implement a Software Process Improvement in Small-Settings

One of the Impediments to put in practice a Software Process Improvement (SPI) program in Small-Settings is because the majority of these organizations do not have a SPI group or a SPI specialist dedicated full time to SPI activities. Moreover, Small-Settings could not distract their own resources for process improvement activities.

Some Small-Settings implementations experiences founded that the principal factor to affect the success of a SPI program in a Small-Setting is the implementation costs [4, 5]. The fact is that Small-Settings are not able to afford the costs that represent an SPI specialist. Consequently, a small business in general is undersized to have personal dedicate full time to implement a SPI program. Moreover the SPI consultant costs are often prohibitive for small organizations.

This paper takes the outsourcing advantages and applies its structure to propose an alternative solution to make available a SPI program for Small-Settings. This outsourcing solution will provide the process improvement infrastructure to implement with an affordable cost an SPI program in Small-Settings. With this outsourcing it is possible to share the SPI infrastructure costs between several Small-Settings.

2 Alternative Software Process Improvement Outsourcing solution for Small-Settings

Every process improvement project requires at the initial phase a group of specialists that facilitate the definition, maintenance, and improvement of the software process. This group could be defined in the SPI infrastructure, and will help the organization to implement and institutionalize a continuous process improvement. The name of this group is Software Process Improvement Group (SEPG).

The SEPG is the most important component of the improvement infrastructure, and is the engine and the catalyst of the SPI program itself [6]. The SEPG infrastructure, elements and responsibilities most be clearly defined at beginning of the project, in the Initiating phase of the IDEAL approach, and be staffed with competent persons possessing both management and technical skills. It is crucial that these persons have good interpersonal skills because the success depends on ability to communicate, teach, negotiate, and consult all SPI problems and activities [7]. Also the SEPG must have the specific domain knowledge of the industrial domain to be supported.

The IDEAL model recommends that 1-3% of the organizational personnel be applied to support SEPG. In an organization with less that 30 people is recommended that at least one person be applied full time to facilitate and execute SPI.

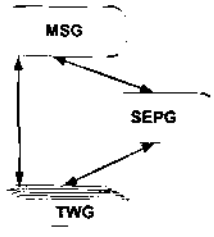

Figure-1 IDEAL's SPI infrastructure

To get a reasonably price to implement an SPI program in Small-Settings, this paper proposes an alternative SPI Outsourcing infrastructure solution. This solution is based on the SPI infrastructure described by the IDEAL model (Figure-1) [6]. This outsourcing solution takes the advantages of IDEAL and includes the modifications that to adapt the SPI infrastructure for an outsourcing situation (Figure-2).

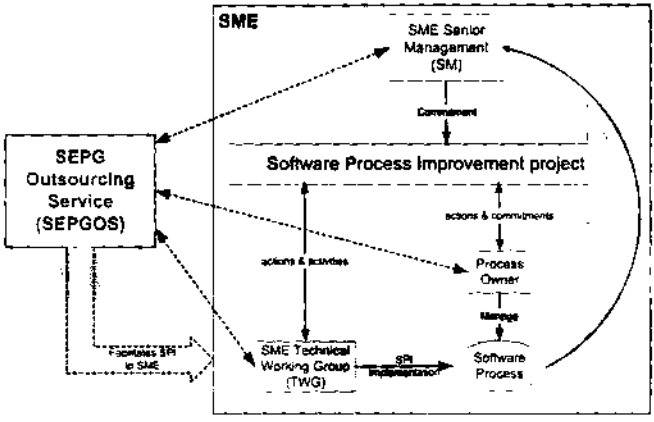

Figure-2 SEPG outsourcing service infrastructure

The focal point of the SPI Outsourcing solution is SEPG externalization, therefore this paper proposes an SEPG outsourcing infrastructure with the following functions descriptions:

Small-Setting senior management (SM). The SM takes also the name of: CEO, chairman, senior manager, high-level manager, etc. and his principal function are providing commitments and sponsorships for the entire SPI initiative.

Small-Setting technical working group (TWG). The TWG is the operative element of the SPI program, and address a specific process area in order to improve it. The TWG members are the software process developers and report directly to the process owner.

Small-Setting process owner. Is responsible for managing a specific Small-Setting process, support the improvement plans, and participate in improvement activities. Also he provides information and measurements of the process. In a typical Small-Setting the leader of TWG is the process owner. The process owner reports directly to senior manager.

SEPG outsourcing service (SEPGOS). The services provided by the SEPG are outside of Small-Setting. In consequence an external organization provides all SPI outsourcing service. The SEPGOS does not implement or develop the improvements, but its mission is planning and coordinating the individual improvement actions, leading the improvement effort and facilitate to Small-Setting all SPI activities. In addition, the SEPGOS has a significant role in building a positive, improvement-oriented culture by promoting awareness and collaborative communication about the improvement action. The SEPGOS should be shared by various Small-Settings to split up the cost that implies a qualified SEPG.

2.1. Organizational structure of the SEPG outsourcing service

The SEPGOS is organised in several Software Engineering Process Groups, each SEPG is specialized in a specific industrial domain such as Government, Financial, Services Industry, Commercial, Manufacturing, Travel Industry etc. Each SEPG is composed for at least one leader by domain. The SEPG could give SPI services for several Small-Settings depending of the size of each SPI project. Consequently the SEPGOS organizational size is directly proportional to the number of SPI projects of each Small-Setting. With the use of this model the cost that implies a qualified SEPG is divided between several Small-Settings (Figure-3).

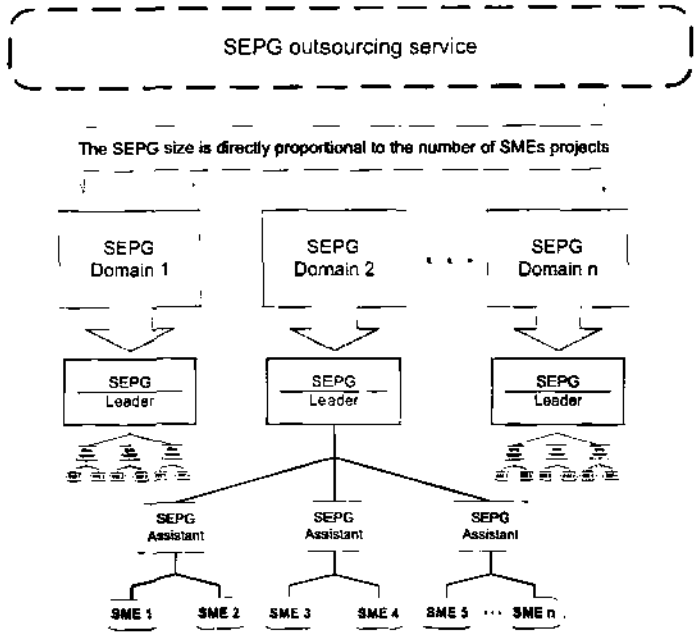

Figure-3 Organizational structure of the SEPG outsourcing service

2.2. SEPG outsourcing service lifecycle

The phases of the SEPG outsourcing lifecycle are similar for small and large organizations, but the amount of complexity and work involved require different approaches. The lifecycle of the SEPG outsourcing service (SEPGOS) include three phases:

Beginning → Ongoing → Conclusion

Beginning. Negotiate SPI service costs; establish a formal agreement with Small-Settings that clearly articulates the responsibilities and commitments; obtain and use SPI feedback in order to ensure that the services are meeting the Small-Setting's requirements and the agreed-upon commitments.

Ongoing. Deliver SPI service according to the agreed-upon commitments; planning and tracking the SPI activities; provide adequate SPI training to enable effectively use the SPI practices; identify problems that impact the SPI service delivery and take both preventive and corrective actions.

Conclusion. Transfer the responsibility and the knowledge back to the Small-Setting or to another SPI service provider according to the agreed-upon commitments; manage the effective transfer of resources to the new SPI service provider.

3 Implementation of the SEPG outsourcing service

The Polytechnic University of Madrid in collaboration with ENDESA, Everis Foundation, and Sun Microsystems supports the Research Group of Software Process Improvement for Spain and Latin American Region. The main objective of this Research Group is the investigation, adaptation and diffusion of software process improvement techniques, and transference this knowledge to industries.

A research line of this group focuses on developing mechanisms for Software Process Improvement in Small-Settings. In agreement with this research line the Spanish government through Ministry of Industry, Tourism and Trade will support those projects for implementing Software Processes Improvement in Small and Medium Enterprises (SME). The objective of the program is to obtain a measurable quality improvement of the software produced by SMEs in Spain. The SPI proposal must be includes: the commitment of each one of SMEs to reach the certification, the previous appraisal of the current state of software process, the definition of the certification level that each SMEs needs, and the implementation of the SPI project in each one of SMEs.

The Research Group of Software Process Improvement for Spain and Latin American Region in collaboration with an association of small companies and freelance software developers has presented the previous proposal to grant funding by the Spanish government. The proposal consists of the CMMI implementation in 26 small companies to get certification CMMI capacity level 2.

The aims is innovating the software processes and improve the quality of the software of those 26 SMEs. In order to help the implementation of the SEPG outsourcing service applied in a group of 26 small companies could be the best solution to commit an affordable cost the SME implementation and certification.

4 Conclusions

This papèr proposes an alternative SPI outsourcing solution that will be useful to resolve some Small-Settings software process problems. With the outsourcing of the SPI services some Small-Settings could improve their software process at affordable cost. The focal point of this model is the outsourcing SEPG functions in order to share its costs between several small and medium-sized organizations.

One example about the benefits of the externalization of the SEPG was presented by Vodafone Spain [8]. This company subcontracts the services of an external SEPG to help them and implement the process areas of the CMMI level 2. The external SEPG supplier gives all SPI services and leads the improvement effort of the R&D group of approximately 50 members. This outsourcing service has helped Vodafone to reach CMMI maturity level 2.

The Research Group of Software Process Improvement for Spain and Latin American Region will implement this outsourcing solution to support the Software Process Improvement activities for 26 SMEs in a project founding by the Spanish government.

However, it is important to considerer the following advantages and disadvantages of an alternative SPI outsourcing model for its implementation:

Advantages

- The implementation costs of SPI, with sharing expenses among several SMEs, are diminished.
- The software process improvements could be measured by the use of standards as to compare it with diverse SMEs projects (benchmarking).
- A preventive approach to identify the SPI implementation problems is reached.

- The lesson learned could be used by other projects, because the Process Assets Library (PAL) includes information of the projects of each SMEs.
- The SPI project will collect the experiences that assurance the improvement for each SME.

Disadvantages

- The projects that are not in the same industrial domain of SMEs have implementation difficulties.
- The expert staff to commit the improvement is required.
- The group of companies must be homogenous and non-dispersed to be guaranteed that the implementation of the SEPGOS.
- The outsourcing staff is invasive and external to the company consequently it is difficult to establish effective mechanisms of communication.
- A minimum number of companies that share the SEPG infrastructure cost is required.
- The change resistance and the confidentiality of information could be a negative factor to commit the improvement.
- Special communication systems and manage mechanism to control the improvement activities for each SME is required.

The potential benefits of the SEPG outsourcing service that this paper proposed will show its effectiveness with the implementation of the SEPG outsourcing service in the CMMI certification project for 26 Spanish SMEs.

References.

1. GONZALEZ, R., GASCO, J., and LLOPIS, J., "Information systems outsourcing reasons in the largest Spanish firms," *International Journal of Information Management*, vol. 25, (2004), 117–136
2. KAKABADSE, A. and KAKABADSE, N., "Trends in Outsourcing: Contrasting USA and Europe," *European Management Journal*, vol. 20 No. 2, (2002), 189–198
3. NAMASIVAYAM, S., "Profiting from Business Process Outsourcing," *IT Pro*, (2004), 12 - 18
4. NIAZI, M., WILSON, D., ZOWGHI, D., and WONG, B., "A Model for the Implementation of Software Process Improvement: An Empirical Study," presented at Product Focused Software Process Improvement: 5th International Conference, (PROFES 2004). Kansai Science City, Japan, (2004), 1-16
5. BATISTA, J., "SPI in a very small team: a case with CMM," *Software Process: Improvement and Practice*, vol. 5, (2000), 243-250
6. MCFEELEY, R., "IDEAL: A User's Guide for Software Process Improvement," in *CMU/SEI-96-HB-001*, IDEAL, Ed. Pittsburgh, PA.: Software Engineering Institute, Carnegie Mellon University, (1996)
7. MOGILENSKY, J. and DEIMEL, B. L., "Where Do People Fit in the CMM ?," *American Programmer*, vol. 7, (1994), 36 - 43
8. VODAFONE, "Eficiencia, calidad y productividad con CMMI," in *R&D Vodafone Spain:*, S. A. Vodafone España, Ed. Madrid, Spain: Borland Day. (May 26, 2005)